

In the Specification:

On page 1, prior to line 4, please insert the following headings and paragraph:

--Cross Reference to Related Applications

This application is for entry into the U.S. national phase under §371 for International Application No. PCT/FI03/000634 having an international filing date of August 29, 2003, and from which priority is claimed under all applicable sections of Title 35 of the United States Code including, but not limited to, Sections 120, 363 and 365(c).

Technical Field--

On page 1, please amend the paragraph beginning at line 4 as follows:

--The present invention relates to an electrically controlled cell type device ~~according to the preamble of the appended independent claim 1~~ comprising at least one electrically and individually controllable cell with at least two separate electrode structures arranged within the cell, the electrode structures capable of storing electric charges.--

On page 1, prior to line 7, please insert the following heading

--Background of the Invention--

On page 1, please amend the paragraph beginning at line 7 as follows:

--Display panels in the form of array of cells, where individual cells contain electrically deformable material, are known in the art. Patent publication WO 01/48531, for example, discloses display panel structures where the cells each comprise two deformable dielectric layers, which meet at a common interface. One of said dielectrics can be air, the other is preferably a polymer material acting as a relief forming gel. For each cell, there is a first electrode structure, a support electrode structure is arranged on one side (below) of said dielectric

layers, and a second electrode structure, a signal electrode structure on the other side (above) of said layers, there being means for providing signals to the signal electrodes in order to create electric fields through the two dielectric layers and to further create surface reliefs on the gel surface at the interface of said two dielectrics. The periodical, typically sinusoidally varying reliefs created on the gel surface in each of the cells allows under the effect of light from a light source to create images on the display panel, which are viewable by the naked eye.

On page 2, please amend the paragraph beginning at line 11 as follows:

--In an earlier patent application PCT/FI02/00512 (now published under WO 2003/107087), ~~which has not yet been published at the time of filing of this application~~, the Applicant has already proposed a novel electrode configuration for light modulator cells based on the use of dielectric and viscoelastic materials to facilitate enhanced and active deformation of the viscoelastic material. The basic idea of said electrode configuration is to utilize active fieldshaping enhancement electrode structure located in the proximity, and in addition, to the traditional signal electrode structure of a cell in order to affect the electric field between the signal electrode structure and the support electrode structure and through the viscoelastic layer in a manner that the deformation amplitude of the viscoelastic layer in the cell is increased. The enhancement electrodes may have with respect to the signal electrodes, for example, an in-plane-type configuration or a sandwich-type configuration. The various embodiments of the enhancement electrode configurations are explained in more detail in the aforementioned earlier application.--

On page 2, please amend the paragraph beginning at line 24 as follows:

--The major shortcomings of such light modulators may be associated with the practical difficulties in producing desired gel relief profiles with good precision. This, of course, impairs the light modulating capabilities of the individual pixels or cells. Especially in the case of

portable devices, [[also]] the power consumption also becomes very important. The increase of diffraction amplitude of the gel relief typically also increases the power consumption.--

On page 2, please amend the paragraph beginning at line 28 as follows:

--The enhancement electrodes according to PCT/FI02/00512 can, among other things, increase the diffraction efficiency of the light modulator cells, shorten the response time required to switch a cell (pixel) between on and off states, and [[to]] reduce the voltage levels required for a defined diffraction amplitude, that is for a certain height of a gel relief. Therefore, the developments described in said patent application aim to the manufacturing of light modulators with better optical contrast, higher switching speed and smaller power consumption.--

On page 3, prior to line 1, please insert the following heading:

--Summary of the Invention--

On page 3, please amend the paragraph beginning at line 25 as follows:

--In its broadest sense, however, the current invention is not limited to the new type of driving scheme for the enhancement electrodes, but other electrical implementations for the basic idea of charge recycling on a cell or pixel basis in an electrical device can be thought of. Instead of enhancement electrodes, a cell or pixel in a light modulator or even other electrical device might be arranged with a charge recycling/storing capacitor or similar element, which is individually addressable via one or more switching elements. In the literature, charge recycling schemes have been researched to lower the power consumption of capacitor-based display systems, however, in all reported systems so far the capacitors used for charge storage and recycling have been arranged outside the pixel display structure and therefore outside individual cells. These charge recycling storages/capacitors have also been common to all of the pixels, i.e. not individually addressable on single pixel basis. The current presentation is, according to the best knowledge of

the Applicant, the first to disclose the idea of arranging individually addressable charge storages within individual pixels of a cell type device.--

On page 4, please amend the paragraph beginning at line 7 as follows:

--To attain these purposes, the electrically controlled device according to the invention is primarily characterized in ~~what will be presented in the characterizing part of the independent claim 1~~ that the device comprises at least one electrically and individually controllable cell with at least two separate electrode structures arranged within said cell, said electrode structures capable of storing electric charges, the device comprising further means to transfer electric charges in a temporally controlled manner between said at least two separate electrode structures, and that for at least one of said the electrode structures within said cell, said charge transfer means comprises substantially the only means for providing electrical power and/or electrical driving.--

On page 4, prior to line 17, please insert the following heading:

--Brief Description of the Drawings--

On page 5, prior to line 14, please insert the following heading:

--Detailed Description of the Invention--

On page 8, please amend the paragraph beginning at line 31 as follows:

--Depending on the properties of the polymer material 12, it is possible that the surface of polymer layer 12 is flattened out after the aforementioned phase 1 of the switching off process already [[in]] to a degree that the pixel can be considered as being practically switched off. However, if this is not the case or if the switching off process is too slow, optional phases 2 and 3 of the switching off process can be applied, as schematically described in following Figs 6-8.--

On page 11, please amend the paragraph beginning at line 22 as follows:

--As already mentioned, in its broadest sense, the current invention is not even limited to the use of enhancement electrodes, but other electrical implementations, where the charge storage and transfer is arranged to take place individually for single pixels, are possible within the appended claims. For example, instead of enhancement electrodes, a pixel in a light modulator device might be arranged with a charge recycling capacitor, i.e. a charge storage capacitor, which is individually addressable via one or more switching elements.--

On page 12, please amend the paragraph beginning at line 31 as follows:

--Optimization parameters that may be selected according to the specific application, for a given signal electrode structure, include for example the number and width of the enhancement electrodes-, the distance between the enhancement electrodes and the signal electrodes. The enhancement electrode voltage also is a parameter for optimization depending on voltage applied to the signal electrodes and support electrodes.--